Fermentation of table olives by oleuropeinolytic starter culture in reduced salt brines and inactivation of *Escherichia coli* O157:H7 and *Listeria monocytogenes*

M. Tataridou, P. Kotzekidou

Laboratory of Food Microbiology and Hygiene, Department of Food Science and Technology, Faculty of Agriculture, Aristotle University of Thessaloniki, GR 54124 Thessaloniki, Greece

**ARTICLE INFO**

Article history:
Received 13 January 2015
Received in revised form 14 May 2015
Accepted 3 June 2015
Available online 6 June 2015

Chemical compounds studied in this article:
Oleuropein (PubChem CID: 5281544)
Hydroxytyrosol (PubChem CID: 82755)
Tyrosol (PubChem CID: 10303)
Protocatechuic acid (PubChem CID: 72)
Caffeic acid (PubChem CID: 689043)
p-Hydroxybenzoic acid (PubChem CID: 135)
Vanillin (PubChem CID: 1183)
Vanillic acid (PubChem CID: 8468)
p-Coumaric acid (PubChem CID: 637542)

Keywords:
Oleuropeinolytic starter culture
Green olives Chalkidikis
Black Kalamata olives
*Escherichia coli* O157:H7
*Listeria monocytogenes*
Biophenols

**ABSTRACT**

The effect of an autochthonous starter culture developed by oleuropeinolytic strains belonging to the *Lactobacillus plantarum* group on the physicochemical and microbiological characteristics and the biophenol content of table olives fermented under reduced salt conditions was studied. Black (cv. Kalamata) and green (cv. Chalkidiki) olives were fermented in two different kinds of brine (Brine A containing 2.3% NaCl, 32.3 mM Ca-aceate and 33.9 mM Ca-lactate and Brine B containing 4% NaCl, pH 5.0 in both brines). The sensory attributes of olives fermented by oleuropeinolytic starter culture assessed by a trained panel did not differ significantly compared with industrial processing. It is possible to carry out significant changes in table olive processing applying a completely microbiological procedure using oleuropeinolytic strains of the *L. plantarum* group as both the debittering and the fermentation agent in order to achieve improved sensorial and nutritional characteristics of the final product. Table olives processed by the suggested methodology may constitute a good source of biophenols in the diet, especially hydroxytyrosol and tyrosol. The inactivation potential of *Escherichia coli* O157:EDL-932 and *Listeria monocytogenes* Scott A in olives fermented by oleuropeinolytic starter culture was evaluated. The population of each pathogen in olive homogenates of both cultivars is inactivated by more than 6 log CFU/ml in less than 24 h. When whole fermented olives were submerged in peptone/saline (containing 6.7 log CFU/ml of the relevant bacterial pathogen) for 30 min followed by rinsing in distilled water, the population of viable foodborne pathogens dropped more than 4 logs in olive pulp. During subsequent storage at 22 or 4 °C the population of *L. monocytogenes* Scott A was further eliminated under the detection limit in both olive cultivars whereas the population of *E. coli* O157:EDL-932 could be detected in olives stored in peptone/saline at 22 °C for 7 days. The inhibitory effect of olives fermented by oleuropeinolytic starter culture in reduced salt brines on pathogens is due to the antimicrobial activity of the phenolic compounds and the antagonistic action of the associated microflora.